

unavoidable impurities and having a structure subjected to tempering after quench hardening or carbonitriding, wherein the hardness after said tempering is at least HRC 58, when tempered at a temperature in a range of 180°C to 350 °C, and the maximum carbide size is not more than 8 μm .

REMARKS

Claims 1 and 2 are pending in this Application. In response to the Office Action dated August 24, 2001, claim 1 has been amended. Care has been exercised to avoid the introduction new matter. Indeed, adequate descriptive support for the present should be apparent throughout the originally filed disclosure as, for example, page 5 of the written description of the specification, lines 13 through 16. Applicants submit that the present Amendment does not generate any new matter issue.

A clean copy of amended claim 1 appears in the Appendix hereto.

Request for Clarification

Applicants note the Office Action Summary indicates that claim 2 is subject of objection. However, it is not apparent wherein the Examiner has stated any basis for objecting to claim 2. Accordingly, Applicants request clarification of the indicated objection to claim 2.

Claims 1 and 2 were rejected under 35 U.S.C. §103 for obviousness predicated upon Nakamura et al. in view of Takata et al.

In the statement of the rejection, the Examiner concluded that one having ordinary skill in the art would have been motivated to quench harden and temper the steel disclosed by Nakamura et al. in view of Takata et al. The Examiner then concluded that the resulting properties would correspond to those of the claimed invention. This rejection is traversed.

There are fundamental differences between the claimed invention and the applied prior art that undermine the obviousness conclusion under 35 U.S.C. §103. Specifically, the claimed invention is directed to a part of an antifriction bearing for **high temperature use**. The claimed part contains particular elements in particular ranges and exhibits a hardness of at least HRC 58, when tempered at 180°C to 350°C, and a maximum carbide size not greater than 8µm. The combination of these claim features render the part suitable for high temperature use. None of the applied references disclose or suggest such a part, or any part for high temperature use.

Nakamura does not even disclose a high temperature bearing. The tempering temperature employed in the disclosed embodiments is 150°C. Nakamura et al. give no hint as to whether a hardness of HRC 58 or higher can be obtained at a temperature of 180°C or higher.

Takata et al., similarly, do not disclose a high temperature bearing at all. A tempering temperature in accordance with the disclosed embodiments is 170°C. Takata

et al. also give no clue as to whether a hardness of HRC 58 can be obtained by tempering at a temperature of 180°C or higher.

Applicants recognize that the claim limitation of tempering relates to processing. However, as the Examiner must surely appreciate, in the metallurgical art the **properties** of a steel are **inextricably linked** to processing conditions, particularly tempering. As such, the tempered limitation of claim 1 can not properly be ignore, particularly when the hardness property generated by that processes limitation, i.e., a hardness of at least HRC 58, is recited in the claim. *In re Garnero*, 412 F.2d 276, 162 USPQ 221 (CCPA 1969).

In establishing the requisite motivation, the Court of Appeals for the Federal Circuit has repeatedly held that the Examiner must make "clear and particular" factual findings as to a specific understanding or specific technological principle which would have realistically impelled one having ordinary skill in the art to modify a particular prior art reference (the steel disclosed by Nakamura et al.) to arrive at the claimed invention based upon facts--not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000). Significantly, the requisite motivation must be undertaken from the viewpoint of one having ordinary skill in the art **confronted with the same problem** confronted by Applicants. *Ecolochem Inc. v. Southern California Edison, Co.* 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998). In this respect, it is significant to note that neither of the applied references even consider a **high temperature** application. Thus, it cannot be said that one having ordinary skill in the art would have been realistically motivated to modify the compositional ranges disclosed by Nakamura et al. and then go one step further and process the steel by tempering, after quench hardening or

carbonitriding, at a temperature of 180°C to 350°C, which temperature is not even disclosed by the references, with any **reasonable expectation** of achieving a hardness of at least HRC 58. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Applicants, therefore, submit that one having ordinary skill in the art would not have found the claimed invention *prima facie* obvious based upon Nakamura et al. and Takata et al. Moreover, there are potent indicia of nonobviousness that mandate the nonobvious conclusion.

Specifically, the **problem** addressed and solved by a claimed invention must be given consideration in resolving the ultimate legal conclusion of obviousness under 35 U.S.C. §103. *North American Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 28 USPQ2d 1333 (Fed. Cir. 1993); *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 15 USPQ2d 1321 (Fed. Cir. 1990); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989); *In re Nomiya*, 509 F.2d 566, 184 USPQ 607 (CCPA 1975). In this respect, Applicants would note that the present invention addresses and solves problems experienced at **high temperatures**, which problems are not even considered by the applied prior art. In accordance with the present invention, as disclosed throughout the written description of the specification, high temperature tempering is performed to ensure **dimensional stability**. Significantly high temperature tempering disadvantageously generates problems, such as lower hardness and shortening of bearing life. These problems are not addressed by the applied references. Applicants, however, address and solve such problems by strategically formulating the claimed composition range and _____ certain processing conditions, thereby enabling the manufacture of a part exhibiting higher dimensional stability and sufficient hardness. The achievement

of such a combination of conflicting objectives is not even on the radar screen of the applied prior art. Under such circumstances, the problem addressed and solved by the claimed invention is entitled to consideration as a potent indicium of **nonobviousness**.

Moreover, it is well settled that **evidence in the specification** must be given consideration anent the **nonobviousness** issue. *In re Soni*, 54 F.3d 746, 34 USPQ2d 1685 (Fed. Cir. 1995); *In re Margolis*, 785 F.2d 1029, 228 USPQ 940 (Fed. Cir. 1986). In this respect, Applicants would invite the Examiner's attention to the data appearing in **Tables 1 and 3** which demonstrate the functional significance of various alloying elements on the properties of the steel. For example, it is apparent that elements such as nickel, sulfur, phosphorous, manganese, carbon, molybdenum, vanadium as well as trace amounts of aluminum, titanium, oxygen and nitrogen, impact the temper hardness and rolling contact fatigue life. Such evidence clearly **undermines** any notion that somehow the combined disclosures would result in a steel which **necessarily** exhibits a hardness after tempering at a temperature of 180°C to about 350°C of at least HRC 58, or a maximum carbide size not greater than 8µm.

Conclusion

It should, therefore, be apparent that a prima facie basis to deny patentability to the claimed invention has not been established. Moreover, upon giving due consideration to the objective evidence of nonobviousness in the specification, which objective evidence also **undermines any notion that the combined disclosures of the applied prior art inherently result in a product satisfying the properties of the claimed invention**, and upon giving due consideration to the problem addressed and solved by the

claimed invention, the conclusion appears inescapable that one having ordinary skill in the art would **not** have found the claimed invention **as a whole** obvious within the meaning of 35 U.S.C. §103. *In re Piasecki*, 745 F.2d 1468, 223 USPQ 785 (Fed. Cir. 1984). Applicants, therefore, submit that the imposed rejection of claims 1 and 2 under 35 U.S.C. §103 for obviousness predicated upon Nakamura et al. in view of Takata et al. is not factually or legally viable and, hence, solicit withdrawal.

Claims 1 and 2 were rejected under 35 U.S.C. §103 for obviousness predicated upon Takada et al. in view of Ochi et al.

In the statement of the rejection, the Examiner concluded that one having ordinary having skill in the art would have been motivated to introduce nickel into the bearing steel alloy disclosed by Takada et al. This rejection is traversed.

As previously pointed out, the concept of providing a high temperature bearing part is alien to Takada et al. The secondary reference to Ochi et al., similarly, does not disclose a high temperature bearing at all. The disclosed tempering temperature in accordance with the embodiments of this reference is 160°C. Ochi et al., therefore, would **not** have led one having ordinary skill in the art to even contemplate a hardness of HRC 58 or higher attained by heating at a temperature of 180°C or higher.

Applicants submit that one having ordinary skill in the art confronted with the **problem** of producing a high strength bearing without sacrificing hardness and fatigue life would **not** have been realistically led to the particular steel composition and properties specified in independent claim 1 based on the applied references with a **reasonable expectation of success**. *Ecolchem Inc. v. Southern California Edison*,

supra; *In re Rouffet, supra.*; *In re Vaeck, supra.* This conclusion is supported by the fact that neither of the applied references disclose a high temperature bearing.

As previously argued, the **problem** addressed and solved by the claimed invention not only **undermines the motivational element** but also constitutes a potent indicum of **nonobviousness**. As also previously pointed out, the **data** in the specification notably Tables 1 and 3, demonstrate the significance of various alloying elements on the properties of the resulting steel, particularly the temper hardness and rolling contact life. Such evidence not only evinces the **nonobviousness** of the claimed invention but also **undermines** any notion that **simply** combining the applied references would **necessarily** produce a steel exhibiting the hardness and properties recited in independent claim 1. Moreover, the notion that **if** the applied references are combined, and **if** the right compositional elements are chosen, and **if** the right tempering is performed, **then** the claimed invention would result, is legally erroneous in that it confuses obviousness with inherency. *In re Rijckaert*, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993); *In re Shetty*, 566 F.2d 81, 195 USPQ 753 (CCPA 1977).

It should, therefore, be apparent that a prima facie basis to deny patentability to the claimed invention has **not** been established. Moreover, upon giving due consideration to the problem addressed and solved by the claimed invention and the objective evidence of nonobviousness in the specification which also undermines any inherency theory, the conclusion appears escapable that one having ordinary skill in the art would **not have found** the claimed invention as a **whole** obvious within the meaning of 35 U.S.C. §103. *In re Piasecki, supra.*

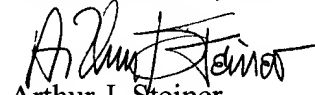
Applicants, therefore, submit that the imposed rejection of claims 1 and 2 under 35 U.S.C. §103 for obviousness predicated upon Takata et al. in view of Ochi et al. is not factually or legally viable and, hence, solicit withdrawal thereof.

It should, therefore, be apparent that the imposed rejections have been overcome and that this application is in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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APPENDIX

(November 8, 2001)

B (1) 1. (Amended) A part of an antifriction bearing for a high temperature having an inner ring, an outer ring and a rolling element, consisting of a steel product containing C by at least 0.6% and not more than 1.3%, Si by at least 0.3% and not more than 3.0%, Mn by at least 0.2% and not more than 1.5%, P by not more than 0.03%, S by not more than 0.03%, Cr by at least 0.3% and not more than 5.0%, Ni by at least 0.1% and not more than 3.0%, Al by not more than 0.050%, Ti by not more than 0.003%, O by not more than 0.0015% and N by not more than 0.015% in mass % as the contents of alloying elements with the rest consisting of Fe and unavoidable impurities and having a structure subjected to tempering after quench hardening or carbonitriding, wherein the hardness after said tempering is at least HRC 58, when tempered at a temperature in a range of 180°C to 350 °C, and the maximum carbide size is not more than 8 µm.